

**FORMATION OF THIN SEMICONDUCTOR LAYERS BY LOW-ENERGY
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION AND
SEMICONDUCTOR HETEROSTRUCTURE DEVICES**

Abstract of the Disclosure

Method for forming a highly relaxed epitaxial semiconductor layer (52) with a thickness between 100nm and 800nm in a growth chamber includes four principle steps. In a first step, the method provides a substrate (51) in the growth chamber on a substrate carrier. In a second step, the method maintains a constant substrate temperature (T_s) of the substrate (51) in a range between 350⁰C and 500⁰C. In a third step, the method establishes a high-density, low-energy plasma in the growth chamber such that the substrate (51) is being exposed to the plasma. In a fourth step, the method directs Silane gas (SiH_4) and Germane gas (GeH_4) through the gas inlet into the growth chamber, the flow rates of the Silane gas and the Germane gas being adjusted in order to form said semiconductor layer (52) by means of vapor deposition with a growth rate in a range between 1 and 10 nm/s. The said semiconductor layer (52) has a Germanium concentration x in a range between $0 < x < 50\%$.